



PATENT
Attorney Docket No. DOW-04646

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JAN 09 2001

In re Application of: George P. Lomonosoff *et al.*
Serial No.: 09/304,967
Filed: 05/05/99
Entitled: **Modified Plant Viruses as Vectors of
Heterologous Peptides**

Group No.: 1645
Examiner: P.Bui
TECH CENTER 1600/2900

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Assistant Commissioner for Patents
Washington, D.C. 20231

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Dated:

Jan. 2, 2001

By:

Marilyn May
Marilyn May

Sir:

I hereby state that the enclosed Sequence Listing is being submitted in paper copy and on a computer-readable diskette, and that the content of the paper and computer readable copies are the same.

Dated: 2 January 2001

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<110> Lomonossoff, George P.
Johnson, John E.
Bendig, Mary
Jones, Tim
Longstaff, Marian

<120> Modified Plant Viruses as Vectors of Heterologous Peptides

<130> DOW-04646

<140> 09/304,967

<141> 1999-05-05

<150> 08/471,048

<151> 1995-06-06

<150> 08/612,858

<151> 1996-03-12

<150> 08/137,032

<151> 1993-03-18

<150> PCT/GB20/00589

<151> 1992-04-02

<160> 123

<170> PatentIn Ver. 2.0

<210> 1

<211> 120

<212> DNA

<213> Cowpea mosaic virus

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cctgctccat tttcagacgt tacagcagta acttttgact taatcaacgg caaaataact 120

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<211> 40

<212> PRT

<213> Cowpea mosaic virus

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20 25 30

Asp Leu Ile Asn Gly Lys Ile Thr
35 40

<210> 3

<211> 27

<212> PRT

<213> Foot-and-mouth disease virus

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<400> 3
 Ser Thr Tyr Ser Arg Asn Ala Val Pro Asn Leu Arg Gly Asp Leu Gln
 1 5 10 15

Val Leu Ala Gln Lys Val Ala Arg Thr Leu Pro
 20 25

<210> 4
 <211> 81
 <212> DNA
 <213> Foot-and-mouth disease virus

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 aaaaggttgc tcggactctt c 81

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 <212> DNA
 <213> Foot-and-mouth disease virus

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 ccaacgagcc tgagaaggat c 81

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 <213> Foot-and-mouth disease virus

<400> 6
 Gly Pro Val Cys Ala Glu Ala Ser Asp Val Tyr Ser Pro Cys Met Ile
 1 5 10 15

Ala Ser Thr Tyr Ser Arg Asn Ala Val Pro Asn Leu Arg Gly Asp Leu
 20 25 30

Gln Val Leu Ala Gln Lys Val Ala Arg Thr Leu Pro Ser Thr Pro Pro
 35 40 45

Ala Pro Phe Ser
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<210> 7
 <211> 156
 <212> DNA
 <213> Foot-and-mouth disease virus

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 cggactcttc ctgactcc tcctgctcca ttttca 156

<210> 8
 <211> 52
 <212> PRT
 <213> Foot-and-mouth disease virus

<400> 8

Tyr Ser Pro Cys Met Ile Ala Ser Thr Tyr Ser Arg Asn Ala Val Pro
1 5 10 15

Asn Leu Arg Gly Asp Leu Gln Val Leu Ala Gln Lys Val Ala Arg Thr
20 25 30

Leu Pro Ser Thr Pro Pro Ala Pro Phe Ser Asp Val Thr Ala Val Thr
35 40 45

Phe Asp Leu Ile
50

<210> 9

<211> 156

<212> DNA

<213> Foot-and-mouth disease virus

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gatcttcaag ttttggctca aaagggttgct cggactcttc ctagcactcc tcctgctcca 120
ttttcagacg ttacagcagc aacttttgac ttaatc 156

<210> 10

<211> 156

<212> DNA

<213> Foot-and-mouth disease virus

<400> 10

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ctagaagttc aaaaccgagt tttccaacga gcctgagaag gatcgtgagg aggacgaggt 120
aaaagtctgc aatgtcgtca ttgaaaactg aattag 156

<210> 11

<211> 23

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

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Ala Val Thr Phe Asp Leu Ile
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<211> 69

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<213> Artificial Sequence

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gacttaatc 69

<210> 13
<211> 69
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 13
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gacttaatc 69

<210> 14
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 14
Ser Thr Asp Arg Pro Glu Gly Ile Glu Glu Glu Gly Gly Glu Arg Asp
1 5 10 15

Arg Asp Arg Ser Asp
20

<210> 15
<211> 67
<212> DNA
<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

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cggacgt 67

<210> 16
<211> 59
<212> DNA
<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

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<210> 17
<211> 47
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 17
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1 5 10 15

Ala Ser Thr Asp Arg Pro Glu Gly Ile Glu Glu Glu Gly Gly Glu Arg
20 25 30

Asp Arg Asp Arg Ser Asp Val Thr Ala Val Thr Phe Asp Leu Ile
35 40 45

<210> 18
<211> 141
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

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cgccctgagg gcatcgagga agagggcggg gagcgcatc gtgatcggtc ggacgtcaca 120
gcagtaactt ttgacttaat c 141

<210> 19
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 19
Ser Thr Pro Ala Thr Gly Ile Asp Asn His Arg Glu Ala Lys Leu Asp
1 5 10 15

<210> 20
<211> 52
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 20
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<210> 21
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 21
gtgaggacga tgaccttagc tattagtatc tcttcgattt aacc 44

<210> 22
<211> 42
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 22
Gly Pro Val Cys Ala Glu Ala Ser Asp Val Tyr Ser Pro Cys Met Ile
1 5 10 15
Ala Ser Thr Pro Ala Thr Gly Ile Asp Asn His Arg Glu Ala Lys Leu
20 25 30
Asp Val Thr Ala Val Thr Phe Asp Leu Ile
35 40

<210> 23
<211> 126
<212> DNA
<213> Artificial Sequence

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gctactggaa tcgataatca tagagaagct aaattggacg tcacagcagt aacttttgac 120
ttaatc 126

<210> 24
<211> 39
<212> PRT
<213> Foot-and-mouth disease virus

<400> 24
Tyr Ser Pro Cys Met Ile Ala Ser Thr Val Pro Asn Leu Arg Gly Asp
1 5 10 15
Leu Gln Val Leu Ala Gln Lys Val Ala Arg Thr Leu Pro Asp Val Thr
20 25 30
Ala Val Thr Phe Asp Leu Ile
35

<210> 25
<211> 117
<212> DNA
<213> Foot-and-mouth disease virus

<400> 25
tatagcccat gtatgatagc tagcactgtt cctaatttga gaggagatct tcaagttttg 60
gctcaaaagg ttgctcggac tcttcctgac gtcacagcag taacttttga cttaatc 117

<210> 26
<211> 117
<212> DNA
<213> Foot-and-mouth disease virus

<400> 26
 atatcgggta catactatcg atcgtgacaa ggattaaact ctcctctaga agttcaaaac 60
 cgagttttcc aacgagcctg agaaggactg cagtgtcgtc attgaaaact gaattag 117

<210> 27
 <211> 5
 <212> PRT
 <213> Foot-and-mouth disease virus

<400> 27
 Ser Thr Pro Pro Ala
 1 5

<210> 28
 <211> 17
 <212> DNA
 <213> Foot-and-mouth disease virus

<400> 28
 ctagcactcc tcctgct 17

<210> 29
 <211> 13
 <212> DNA
 <213> Foot-and-mouth disease virus

<400> 29
 gtgaggagga cga 13

<210> 30
 <211> 4
 <212> PRT
 <213> Foot-and-mouth disease virus

<400> 30
 Pro Phe Ser Asp
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<210> 31
 <211> 14
 <212> DNA
 <213> Foot-and-mouth disease virus

<400> 31
 ccattttcag acgt 14

<210> 32
 <211> 10
 <212> DNA
 <213> Foot-and-mouth disease virus

<400> 32
 ggtaaaagtc 10

<210> 33
 <211> 19
 <212> PRT
 <213> Foot-and-mouth disease virus

<400> 33
Val Pro Asn Leu Arg Gly Asp Leu Gln Val Leu Ala Gln Lys Val Ala
1 5 10 15

Arg Thr Leu

<210> 34
<211> 57
<212> DNA
<213> Foot-and-mouth disease virus

<400> 34
gttcctaatt tgagaggaga tcttcaagtt ttggctcaaa aggttgctcg gactctt 57

<210> 35
<211> 57
<212> DNA
<213> Foot-and-mouth disease virus

<400> 35
caaggattaa actctcctct agaagttcaa aaccgagttt tccaacgagc ctgagaa 57

<210> 36
<211> 14
<212> PRT
<213> Foot-and-mouth disease virus

<400> 36
Lys Asp Ala Thr Gly Ile Asp Asn His Arg Glu Ala Lys Leu
1 5 10

<210> 37
<211> 42
<212> DNA
<213> Foot-and-mouth disease virus

<400> 37
aaagatgcta ctggaatcga taatcataga gaagcaaaat tg 42

<210> 38
<211> 42
<212> DNA
<213> Foot-and-mouth disease virus

<400> 38
tttctacgat gaccttagct attagtatct cttcgtttta ac 42

<210> 39
<211> 22
<212> PRT
<213> Foot-and-mouth disease virus

<400> 39
Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu Gly Gly Glu
1 5 10 15

Arg Asp Arg Asp Arg Ser
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<210> 40
<211> 66
<212> DNA
<213> Foot-and-mouth disease virus

<400> 40
cctagaggac cagacagacc tgaaggaata gaagaggaag gtggagaacg cgatcgagat 60
agatca 66

<210> 41
<211> 66
<212> DNA
<213> Foot-and-mouth disease virus

<400> 41
ggatctcctg gtctgtctgg acttccttat cttctccttc cacctcttgc gctagctcta 60
tctagt 66

<210> 42
<211> 13
<212> PRT
<213> Soybean mosaic virus

<400> 42
Met Glu Gly Gly Ser Ser Lys Thr Ala Val Asn Thr Gly
1 5 10

<210> 43
<211> 39
<212> DNA
<213> Soybean mosaic virus

<400> 43
atggaaggag gatcatctaa gactgctgtg aacactggg 39

<210> 44
<211> 39
<212> DNA
<213> Soybean mosaic virus

<400> 44
atggaaggag gatcctctaa gactgctgtg aacactggg 39

<210> 45
<211> 39
<212> DNA
<213> Soybean mosaic virus

<400> 45
atggaaggag gatcatctaa gactgctgtt aacactggg 39

<210> 46
<211> 16
<212> PRT
<213> Homo sapiens

<400> 46
Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
1 5 10 15

<210> 47
<211> 48
<212> DNA
<213> Homo sapiens

<400> 47
gggtgttactt ctgtctcctga tactagacct gctcctgggt ctactgct 48

<210> 48
<211> 48
<212> DNA
<213> Homo sapiens

<400> 48
ccacaatgaa gacgaccact atgatctgga cgaggaccaa gatgacga 48

<210> 49
<211> 68
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 49
gatccggtgt tacttctgct cctgatacta gacctgctcc tggttctact gcttctaaga 60
ctgctgtt 68

<210> 50
<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 50
gccacaatga agacgaccac tatgatctgg acgaggacca agatgacgaa gattctgacg 60
acaa 64

<210> 51
<211> 68
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 51
gacacctgtg tggtacttct gctcctgata ctagacctgc tcctgggttct actgctaaga 60
ctgctgtt 68

<210> 52
<211> 64
<212> DNA
<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

<400> 52
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acaa 64

<210> 53
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<212> DNA
<213> Artificial Sequence

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ctgctggt 68

<210> 54
<211> 64
<212> DNA
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<223> Description of Artificial Sequence: Synthetic

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acaa 64

<210> 55
<211> 68
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

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ctgctggt 68

<210> 56
<211> 64
<212> DNA
<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

<400> 56
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acaa 64

<210> 57
<211> 68
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

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ctgctggt 68

<210> 58
<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 58
gagattctga cgaccacaat gaagacgacc actatgatct ggacgaggac caagatgacg 60
acaa 64

<210> 59
<211> 33
<212> PRT
<213> Soybean mosaic virus

<400> 59
Asn Ile Tyr Ala Pro Ala Arg Leu Thr Ile Ala Ala Ala Asn Ser Ser
1 5 10 15
Ile Asn Ile Ala Ser Val Gly Thr Leu Tyr Ala Thr Tyr Glu Val Glu
20 25 30

Leu

<210> 60
<211> 37
<212> PRT
<213> Soybean mosaic virus

<400> 60
Asn Ile Gly Asn Ile Leu Val Pro Ala Arg Leu Val Ile Ala Met Glu
1 5 10 15
Gly Gly Ser Ser Lys Thr Ala Val Asn Thr Gly Arg Leu Tyr Ala Ser
20 25 30

Tyr Thr Ile Arg Leu
35

<210> 61
<211> 37
<212> PRT
<213> Soybean mosaic virus

<400> 61
Asn Ile Ala Thr Asp Leu Val Pro Ala Arg Leu Val Ile Ala Leu Leu
1 5 10 15
Asp Gly Ser Ser Ser Thr Ala Val Ala Ala Gly Arg Ile Tyr Ala Ser
20 25 30

Tyr Thr Ile Gln Met
35

<210> 62
 <211> 17
 <212> PRT
 <213> Lucerne transient streak virus

<400> 62
 Ile Ala Ala Ala Asn Ser Ser Ile Asn Ile Ala Ser Val Gly Thr Leu
 1 5 10 15

Tyr

<210> 63
 <211> 51
 <212> DNA
 <213> Lucerne transient streak virus

<400> 63
 atagccgcag ctaacagctc cataaacata gctagtgtgg gtactcttta t 51

<210> 64
 <211> 51
 <212> DNA
 <213> Lucerne transient streak virus

<400> 64
 atagctgcag ctaacagctc cataaacata gctagtgtgg gtactcttta t 51

<210> 65
 <211> 51
 <212> DNA
 <213> Lucerne transient streak virus

<400> 65
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<210> 66
 <211> 16
 <212> PRT
 <213> Homo sapiens

<400> 66
 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 1 5 10 15

<210> 67
 <211> 48
 <212> DNA
 <213> Homo sapiens

<400> 67
 ggtgttactt ctgctcctga tactagacct gctcctgggt ctactgct 48

<210> 68
 <211> 48
 <212> DNA
 <213> Homo sapiens

<400> 68
 ccacaatgaa gacgaccact atgatctgga cgaggaccaa gatgacga 48

<210> 69
 <211> 83
 <212> DNA
 <213> Lucerne transient streak virus

<400> 69
 gctaacacgcg gtgttacttc tgctcctgat actagacctg ctcttggttc tactgcttcc 60
 ataaacatag ctagtgtggg tac 83

<210> 70
 <211> 83
 <212> DNA
 <213> Lucerne transient streak virus

<400> 70
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 aaggtatttg tatcgatcac acc 83

<210> 71
 <211> 83
 <212> DNA
 <213> Lucerne transient streak virus

<400> 71
 gctaacagct ccggtgttac ttctgctcct gatactagac ctgctcctgg ttctactgct 60
 ataaacatag ctagtgtggg tac 83

<210> 72
 <211> 83
 <212> DNA
 <213> Lucerne transient streak virus

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 acgatatttg tatcgatcac acc 83

<210> 73
 <211> 83
 <212> DNA
 <213> Lucerne transient streak virus

<400> 73
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 gctaacatag ctagtgtggg tac 83

<210> 74
 <211> 83
 <212> DNA
 <213> Lucerne transient streak virus

<400> 74
 acgtcgattg tcgaggatc cacaatgaag acgaccacta tgatctggac gaggaccaag 60
 atgacgattg tatcgatcac acc 83

<210> 75
 <211> 83
 <212> DNA
 <213> Lucerne transient streak virus

<400> 75
gctaacagct ccataaacgg tggtacttct gtcctgata ctagacctgc tcctgggtct 60
actgctatag ctagtgtggg tac 83

<210> 76
<211> 83
<212> DNA
<213> Lucerne transient streak virus

<400> 76
acgtcgattg tcgaggtatt tgccacaatg aagacgacca ctatgatctg gacgaggacc 60
aagatgacga tatcgatcac acc 83

<210> 77
<211> 83
<212> DNA
<213> Lucerne transient streak virus

<400> 77
gctaacagct ccataaacat aggtgttact tctgctcctg atactagacc tgctcctggt 60
tctactgctg ctagtgtggg tac 83

<210> 78
<211> 83
<212> DNA
<213> Lucerne transient streak virus

<400> 78
acgtcgattg tcgaggtatt tgtatccaca atgaagacga ccactatgat ctggacgagg 60
accaagatga cgacgatcac acc 83

<210> 79
<211> 83
<212> DNA
<213> Lucerne transient streak virus

<400> 79
gctaacagct ccataaacat agctggtgtt acttctgctc ctgatactag acctgctcct 60
ggttctactg ctagtgtggg tac 83

<210> 80
<211> 83
<212> DNA
<213> Lucerne transient streak virus

<400> 80
acgtcgattg tcgaggtatt tgtatcgacc acaatgaaga cgaccactat gatctggacg 60
aggaccaaga tgacgatcac acc 83

<210> 81
<211> 324
<212> PRT
<213> Tomato bushy stunt virus

<400> 81
Lys Lys Gln Gln Met Ile Asn His Val Gly Gly Thr Gly Gly Ala Ile
1 5 10 15
Met Ala Pro Val Ala Val Thr Arg Gln Leu Val Gly Ser Lys Pro Lys
20 25 30

Phe Thr Gly Arg Thr Ser Gly Ser Val Thr Val Thr His Arg Glu Tyr
 35 40 45
 Leu Ser Gln Val Asn Asn Ser Thr Gly Phe Gln Val Asn Gly Gly Ile
 50 55 60
 Val Gly Asn Leu Leu Gln Leu Asn Pro Leu Asn Gly Thr Leu Phe Ser
 65 70 75 80
 Trp Leu Pro Ala Ile Ala Ser Asn Phe Asp Gln Tyr Thr Phe Asn Ser
 85 90 95
 Val Val Leu His Tyr Val Pro Leu Cys Ser Thr Thr Glu Val Gly Arg
 100 105 110
 Val Ala Ile Tyr Phe Asp Lys Asp Ser Glu Asp Pro Glu Pro Ala Asp
 115 120 125
 Arg Val Glu Leu Ala Asn Tyr Ser Val Leu Lys Glu Thr Ala Pro Trp
 130 135 140
 Ala Glu Ala Met Leu Arg Val Pro Thr Asp Lys Ile Lys Arg Phe Cys
 145 150 155 160
 Asp Asp Ser Ser Thr Ser Asp His Lys Leu Ile Asp Leu Gly Gln Leu
 165 170 175
 Gly Ile Ala Thr Tyr Gly Gly Ala Gly Thr Asn Ala Val Gly Asp Ile
 180 185 190
 Phe Ile Ser Tyr Ser Val Thr Leu Tyr Phe Pro Gln Pro Thr Asn Thr
 195 200 205
 Leu Leu Ser Thr Arg Arg Leu Asp Leu Ala Gly Ala Leu Val Thr Ala
 210 215 220
 Ser Gly Pro Gly Tyr Leu Leu Val Ser Arg Thr Ala Thr Val Leu Thr
 225 230 235 240
 Met Thr Phe Arg Ala Thr Gly Thr Phe Val Ile Ser Gly Thr Tyr Arg
 245 250 255
 Cys Leu Thr Ala Thr Thr Leu Gly Leu Ala Gly Gly Val Asn Val Asn
 260 265 270
 Ser Ile Thr Val Val Asp Asn Ile Gly Thr Asp Ser Ala Phe Phe Ile
 275 280 285
 Asn Cys Thr Val Ser Asn Leu Pro Ser Val Val Thr Phe Thr Ser Thr
 290 295 300
 Gly Ile Thr Ser Ala Thr Val His Cys Val Arg Ala Thr Arg Gln Asn
 305 310 315 320
 Asp Val Ser Leu

<210> 82
 <211> 331
 <212> PRT
 <213> Red clover necrotic mosaic virus

<400> 82

Lys Ser Lys Gln Arg Ser Gln Pro Arg Asn Arg Thr Pro Asn Thr Ser
1 5 10 15
Val Lys Thr Val Ala Ile Pro Phe Ala Lys Thr Gln Ile Ile Lys Thr
20 25 30
Val Asn Pro Pro Pro Lys Pro Ala Arg Gly Ile Leu His Thr Gln Leu
35 40 45
Val Met Ser Val Val Gly Ser Val Gln Met Arg Thr Asn Asn Gly Lys
50 55 60
Ser Asn Gln Arg Phe Arg Leu Asn Pro Ser Asn Pro Ala Leu Phe Pro
65 70 75 80
Thr Leu Ala Tyr Glu Ala Ala Asn Tyr Asp Met Tyr Arg Leu Lys Lys
85 90 95
Leu Thr Leu Arg Tyr Val Pro Leu Val Thr Val Gln Asn Ser Gly Arg
100 105 110
Val Ala Met Ile Trp Asp Pro Asp Ser Gln Asp Ser Ala Pro Gln Ser
115 120 125
Arg Gln Glu Ile Ser Ala Tyr Ser Arg Ser Val Ser Thr Ala Val Tyr
130 135 140
Glu Lys Cys Ser Leu Thr Ile Pro Ala Asp Asn Gln Trp Arg Phe Val
145 150 155 160
Ala Asp Asn Thr Thr Val Asp Arg Lys Leu Val Asp Phe Gly Gln Leu
165 170 175
Leu Phe Val Thr His Ser Gly Ser Asp Gly Ile Glu Thr Gly Asp Ile
180 185 190
Phe Leu Asp Cys Glu Val Glu Phe Lys Gly Pro Gln Pro Thr Ala Ser
195 200 205
Ile Val Gln Lys Thr Val Ile Asp Leu Gly Gly Thr Leu Thr Ser Phe
210 215 220
Glu Gly Pro Ser Tyr Leu Met Pro Pro Asp Ala Phe Ile Thr Ser Ser
225 230 235 240
Ser Phe Gly Leu Phe Val Asp Val Ala Gly Thr Tyr Leu Leu Thr Leu
245 250 255
Val Val Thr Cys Ser Thr Thr Gly Ser Val Thr Val Gly Gly Asn Ser
260 265 270
Thr Leu Val Gly Asp Gly Arg Ala Ala Tyr Gly Ser Ser Asn Tyr Ile
275 280 285
Ala Ser Ile Val Phe Thr Ser Ser Gly Val Leu Ser Thr Thr Pro Ser
290 295 300

Val Gln Phe Ser Gly Ser Ser Gly Val Ser Arg Val Gln Met Asn Ile
305 310 315 320

Cys Arg Cys Lys Gln Gly Asn Thr Phe Ile Leu
325 330

<210> 83
<211> 41
<212> PRT
<213> Red clover necrotic mosaic virus

<400> 83
Ala Ser Ile Val Gln Lys Thr Val Ile Asp Leu Gly Gly Thr Leu Thr
1 5 10 15

Ser Phe Glu Gly Pro Ser Tyr Leu Met Pro Pro Asp Ala Phe Ile Thr
20 25 30

Ser Ser Ser Phe Gly Leu Phe Val Asp
35 40

<210> 84
<211> 27
<212> PRT
<213> Red clover necrotic mosaic virus

<400> 84
Ala Ser Ile Val Gln Lys Tyr Val Ile Asp Leu Gly Gly Thr Leu Thr
1 5 10 15

Ser Phe Glu Gly Pro Ser Tyr Leu Met Pro Pro
20 25

<210> 85
<211> 17
<212> PRT
<213> Red clover necrotic mosaic virus

<400> 85
Ser Ile Val Gln Lys Thr Val Ile Asp Leu Gly Gly Thr Leu Thr Ser
1 5 10 15

Phe

<210> 86
<211> 51
<212> DNA
<213> Red clover necrotic mosaic virus

<400> 86
agcatcgtac agaaaaactgt aattgatctc ggtgggacac tcacttcttt c 51

<210> 87
<211> 51
<212> DNA
<213> Red clover necrotic mosaic virus

<400> 87
agcatcgtgc acaaaaactgt aattgatctc ggtgggacac tcacttcttt c 51

<210> 88
 <211> 51
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 88
 agcatcgtac agaaaactgt aattgatctc ggtgggacgt taacttcttt c 51

 <210> 89
 <211> 16
 <212> PRT
 <213> Homo sapiens

 <400> 89
 Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
 1 5 10 15

 <210> 90
 <211> 48
 <212> DNA
 <213> Homo sapiens

 <400> 90
 ggtgttactt ctgctcctga tactagacct gctcctgggt ctactgct 48

 <210> 91
 <211> 48
 <212> DNA
 <213> Homo sapiens

 <400> 91
 ccacaatgaa gacgaccact atgatctgga cgaggaccaa gatgacga 48

 <210> 92
 <211> 78
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 92
 gaaaactgta ggtgttactt ctgctcctga tactagacct gctcctgggt ctactgctat 60
 tgatctcggg gggacgtt 78

 <210> 93
 <211> 82
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 93
 acgtcttttg acatccacaa tgaagacgac cactatgatc tggacgagga ccaagatgac 60
 gataactaga gccaccctgc aa 82

 <210> 94
 <211> 78
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 94
 gaaaactgta attggtgtta cttctgctcc tgatactaga cctgctcctg gttctactgc 60
 tgatctcggg gggacgtt 78

<210> 95
 <211> 82
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 95
 acgtcttttg acattaacca caatgaagac gaccactatg atctggacga ggaccaagat 60
 gacgactaga gccaccctgc aa 82

 <210> 96
 <211> 78
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 96
 gaaaactgta attgatgggtg ttactttctgc tcctgatact agacctgctc ctggttctac 60
 tgctctcggg gggacgtt 78

 <210> 97
 <211> 82
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 97
 acgtcttttg acattaacta ccacaatgaa gacgaccact atgatctgga cgaggaccaa 60
 gatgacgaga gccaccctgc aa 82

 <210> 98
 <211> 78
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 98
 gaaaactgta attgatctcg gtgttacttc tgctcctgat actagacctg ctcttggttc 60
 tactgctggg gggacgtt 78

 <210> 99
 <211> 82
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 99
 acgtcttttg acattaacta gagccacaat gaagacgacc actatgatct ggacgaggac 60
 caagatgacg accaccctgc aa 82

 <210> 100
 <211> 78
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 100
 gaaaactgta attgatctcg gtggtgttac ttctgctcct gatactagac ctgctcctgg 60
 ttctactgct gggacgtt 78

 <210> 101
 <211> 82
 <212> DNA
 <213> Red clover necrotic mosaic virus

 <400> 101
 acgtcttttg acattaacta gagccaccac aatgaagacg accactatga tctggacgag 60
 gaccaagatg acgaccctgc aa 82

<210> 102
<211> 78
<212> DNA
<213> Red clover necrotic mosaic virus

<400> 102
gaaaactgta attgatctcg gtgggggtgt tacttctgct cctgatacta gacctgctcc 60
tggttctact gctacgtt 78

<210> 103
<211> 82
<212> DNA
<213> Red clover necrotic mosaic virus

<400> 103
acgtcttttg acattaacta gagccacccc cacaatgaag acgaccacta tgatctggac 60
gaggaccaag atgacgatgc aa 82

<210> 104
<211> 24
<212> PRT
<213> Tobacco rattle virus

<400> 104
Ser Thr Pro Ala Ser Gly Gly Ser Gly Ala Thr Pro Pro Pro Ala Ser
1 5 10 15

Gly Gly Ala Val Arg Pro Asn Pro
20

<210> 105
<211> 107
<212> DNA
<213> Tobacco rattle virus

<400> 105
cgctcgactcc ggccctcgggg ggaagtgggtg caacaccacc tcctgcgagt gggggtgctg 60
tgcgctcctaa tccttgatgt cgtcaaatca aacctttaag ggacctt 107

<210> 106
<211> 19
<212> PRT
<213> Tobacco rattle virus

<400> 106
Ser Thr Pro Ala Ser Gly Gly Ser Gly Ala Thr Pro Pro Pro Ala Ser
1 5 10 15

Gly Gly Ala

<210> 107
<211> 84
<212> DNA
<213> Tobacco rattle virus

<400> 107
tcgactccgg cctcgggggg aagtgggtgca acaccacctc ctgcgagtgg gggtgcttga 60
tgtcgtaaaa tcaaaccttt aagg 84

<210> 108
 <211> 82
 <212> DNA
 <213> Tobacco rattle virus

 <400> 108
 gaggccggag ccccccttca ccacgttggtg gtggaggacg ctcacccac gaactacagc 60
 agtttagttt ggaaattccc tg 82

 <210> 109
 <211> 14
 <212> PRT
 <213> Tobacco rattle virus

 <400> 109
 Ser Thr Pro Ala Ser Gly Gly Ser Gly Ala Thr Pro Pro Pro
 1 5 10

 <210> 110
 <211> 69
 <212> DNA
 <213> Tobacco rattle virus

 <400> 110
 tcgactccgg cctcgggggg aagtgggtgca acaccacctc cttgatgtcg tcaaatacaa 60
 cctttaagg 69

 <210> 111
 <211> 68
 <212> DNA
 <213> Tobacco rattle virus

 <400> 111
 gaggccggag ccccccttca ccacgttggtg gtggaggaac tacagcagtt tagtttggaa 60
 attccctg 68

 <210> 112
 <211> 9
 <212> PRT
 <213> Tobacco rattle virus

 <400> 112
 Ser Thr Pro Ala Ser Gly Gly Ser Gly
 1 5

 <210> 113
 <211> 54
 <212> DNA
 <213> Tobacco rattle virus

 <400> 113
 tcgactccgg cctcgggggg aagtgggtga tgcgtcaaaa tcaaaccctt aagg 54

 <210> 114
 <211> 53
 <212> DNA
 <213> Tobacco rattle virus

 <400> 114
 gaggccggag ccccccttca ccaactacag cagtttagtt tggaaattcc ctg 53

<210> 115
<211> 4
<212> PRT
<213> Tobacco rattle virus

<400> 115
Ser Thr Pro Ala
1

<210> 116
<211> 39
<212> DNA
<213> Tobacco rattle virus

<400> 116
tcgactccgg cctgatgtcg tcaaatcaaa cctttaagg 39

<210> 117
<211> 38
<212> DNA
<213> Tobacco rattle virus

<400> 117
gaggccggac tacagcagtt tagtttgga attccctg 38

<210> 118
<211> 2
<212> PRT
<213> Tobacco rattle virus

<400> 118
Ser Thr
1

<210> 119
<211> 33
<212> DNA
<213> Tobacco rattle virus

<400> 119
tcgacttgat gtcgtcaaat caaaccttta agg 33

<210> 120
<211> 32
<212> DNA
<213> Tobacco rattle virus

<400> 120
gaactacagc agtttagttt ggaaattccc tg 32

<210> 121
<211> 31
<212> PRT
<213> S. aureus

<400> 121
Gly Gln Asn Asn Gly Asn Gln Ser Phe Glu Glu Asp Thr Glu Lys Asp
1 5 10 15

Lys Pro Lys Tyr Glu Gln Gly Gly Asn Ile Ile Asp Ile Asp Phe
20 25 30

<210> 122
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 122
ctagcatgaa ttttgacctt c 21

B1
<210> 123
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

<400> 123
gtacttaaaa ctggaagaat t 21

Conce.
